

(3) The fauna of the Ozark region is substantially identical with that of the hilly regions of Tennessee. The environment and conditions of life being similar, and water communication being free, we have a similar fauna in regions widely separated.

(4) The fauna of any Texas river is much less rich than that of any stream of similar size and character connected with the basin of the Mississippi. In other words, free water communication is essential to a varied fauna. The larger a river system the greater the number of species in each of its affluents. The reason for this seems obvious.

(5) The fish fauna of Texas differs from that of the Lower Mississippi Valley mainly by its deficiencies. Texas does not properly constitute a distinct faunal region. The paucity of its fish fauna is in some degree connected with its dry, hot summers. Most of the streams are flooded and often very muddy in spring, and are almost dry in summer; both conditions unfavorable to the increase of many species. These conditions do not affect the spring-fed streams of the limestone region.

(6) Some of the conditions favorable to the production in any stream of a large number of species of fishes are the following:

Clear water, a moderate current, a bottom of gravel preferably covered by a growth of weeds; water not too cold and not stagnant; connection with a large hydrographic basin; little fluctuation in the year in volume of the stream or in the character of the water.

These conditions are well realized in the Washita River and in certain affluents of the Ohio and the Tennessee, and in these, among American streams, the greatest number of species has been recorded.

INDIANA UNIVERSITY, *September 18, 1885.*

**NOTES ON FISHES COLLECTED AT BEAUFORT, NORTH CAROLINA,
WITH A REVISED LIST OF THE SPECIES KNOWN FROM THAT
LOCALITY.**

By DAVID S. JORDAN.

Two catalogues of the fishes of Beaufort Harbor have been published. The one (Notes on the Natural History of Fort Macon, N. C., and Vicinity, No. 3, Proc. Ac. Nat. Sci. Phila., 1877, 203-208), by Dr. Henry C. Yarrow, represents the collections made by Dr. Cones and Dr. Yarrow during their residence at Fort Macon, near Beaufort. The other (Notes on Fishes of Beaufort Harbor, North Carolina, Proc. U. S. Nat. Mus., 1878, 365-388), by Professor Gilbert and the writer, includes both the species of the previous list and those actually collected by the authors and the students (A. W. Brayton, B. W. Evermann, and others) who accompanied them at Beaufort in the summer of 1878.

During the present summer (1885) a considerable collection has been made at Beaufort by Mr. Oliver P. Jenkins, teacher of science in the Indiana State Normal School of Terre Haute, in connection with the Johns Hopkins Summer Laboratory, then in session at Beaufort.

Several species not taken by previous collectors were obtained by Mr. Jenkins, and in preparing notes on these I have thought it best to recast the whole list, so as to include only those species concerning which no doubt exists as to their pertinence to the Beaufort fauna. Some errors of identification exist, both in the list of Dr. Yarrow and in that of Jordan & Gilbert, and in both some are included on insufficient or second-hand evidence.

[The numbers in parentheses in this list are those of Jordan & Gilbert's list. Those marked (J.) were first obtained at Beaufort by Mr. Jenkins.]

1. *Branchiostoma lanceolatum* Pallas. (118.)
2. *Carcharhinus terræ-novæ* Richardson. (117.)
3. *Sphyrna tiburo* Linnæus. (116.)
4. *Sphyrna zygaena* Linnæus. (115.)
5. *Carcharias littoralis* Mitchill. (114.)
6. *Pristis pectinatus* Latham. (J.)
7. *Pteroplatea maclura* Le Sueur. (111.)
8. *Dasybatis sayi* Le Sueur. (110.)
9. *Myliobatis freminvillei* Le Sueur. (109.)
10. *Stoasodon narinari* Müller & Henle. (108.)
11. *Manta birostris* Walbaum. (107.) (J.)
12. *Lepidosteus osseus* L. (J.)
13. *Acipenser brevirostrum* Le Sueur. (106.)
14. *Galeichthys felis* L. (104.)
15. *Ælurichthys marinus* Mitchill. (103.)
16. *Stolephorus browni* Gmelin. (102.)
17. *Opisthonema oglinum* Le Sueur. (99.)
18. *Brevoortia tyrannus* Latrobe. (97.)
19. *Elops saurus* L. (95.)
20. *Synodus fœtens* L. (93.)
21. *Cyprinodon variegatus* Lac. (89.)
22. *Fundulus majalis* Walbaum. (91, 92.)
23. *Fundulus heteroclitus* L. (90.)
24. *Gambusia patruelis* B. & G. (J.)
25. *Anguilla anguilla rostrata* Le Sueur. (105.)
26. *Conger conger* L. (J.)
27. *Hemirhamphus roberti* C. & V. (87.)
28. *Halocypselus evolans* L. (86.)
29. *Tylosurus marinus* Gmelin. (83.)
30. *Tylosurus caribbæus* Le Sueur. (84.)
31. *Tylosurus hians* C. & V. (J.)

32. *Menidia menidia* L. (81.)
33. *Menidia laciniata* Swain. (81.)
34. *Querimana gyrans* Jordan & Gilbert. (J.)
35. *Mugil cephalus* L. (80.)
36. *Mugil curema* C. & V. (79.)
37. *Sphyræna borealis* De Kay. (78.)
38. *Echeneis naucrates* L. (76.) (J.)
39. *Remora remora* L. (77.)
40. *Elacate canada* L. (J.)
41. *Trichiurus lepturus* L. (35.)
42. *Scomberomorus maculatus* Mitchill. (38.)
43. *Caranx chrysus* Mitchill. (46.)
44. *Caranx latus* Agassiz. (J.)
45. *Caranx bartholomæi* C. & V. (*C. beani* Jor.)
46. *Caranx hippos* L. (44, 45.)
47. *Caranx crinitus* Mitchill. (43.)
48. *Vomer setipinnis* Mitchill. (40.) (J.)
49. *Selene vomer* L. (41, 42.)
50. *Chloroscombrus chrysurus* L. (J.)
51. *Trachynotus carolinus* L. (48.)
52. *Trachynotus rhomboides* Bloch. (47.)
53. *Stromateus triacanthus* Peck. (50.)
54. *Nomeus gronovii* Gmelin. (J.)

One very young example, taken in a tow-net.

55. *Pomatomus saltatrix* L. (75.)
56. *Serranus atrarius* L. (71.)
57. *Serranus dispilurus* Günther. (J.)

(*Centropristis subligarius* Cope.)

A young specimen, taken in the eel-grass with the next species. Identical with specimens from Pensacola. This species bears some resemblance to *Serranus phæbe*, but the latter, when of equal size, has the eye much larger and the head more robust. There seems to be no doubt of the identity of *Centropristis subligarius* Cope with *C. dispilurus* Günther, described three years earlier from Trinidad.

58. *Mycteroperca microlepis* Goode & Bean. (J.)
59. *Epinephelus morio* C. & V. (70.)
60. *Orthopristis chrysopterus* L. (69.) (68.)
61. *Stenotomus chrysops* L. (67.)
62. *Diplodus holbrooki* Bean. (66.)
63. *Diplodus probatocephalus* Walb. (65.)

64. *Diplodus rhomboides* L. (64.)
65. *Kyphosus sectatrix* L. (63.)
66. *Gerres gula* C. & V. (62.)
67. *Micropogon undulatus* L. (61.)
68. *Menticirrus alburnus* L. (59, 60.)
69. *Menticirrus littoralis* Holbrook. (58.)
70. *Sciæna ocellata* L. (57.)
71. *Sciæna chrysuræ* Lacépède. (56.)
72. *Liostomus xanthurus* Lacépède. (54, 55.)
73. *Pogonias chromis* Lacépède. (53.)
74. *Cynoscion regale* Bloch. (52.)
75. *Cynoscion maculatum* Mitchill. (51.)
76. *Chætodipterus faber* L. (74.)
77. *Hiatula onitis* L. (31.)
78. *PlatyGLOSSUS bivittatus* Bloch. (32.)
79. *PlatyGLOSSUS maculipinna* Müller & Troschel. (33.)
80. *Gobiosoma bosci* Lac. (J.)
81. *Gobionellus encæomus* Jordan & Gilbert. (J.)

Many specimens.

This species is a *Gobionellus* rather than a *Gobius*. It is exceedingly close to *G. stigmaticus* Poey, and on comparison of specimens we can see no differences except that in *encæomus* the body is a little more slender, the markings on the head are obsolete, and the pale cross bands seen in some specimens of *G. stigmaticus* are not found in *G. encæomus*.

82. *Prionotus evolans* L. (30.)
83. *Prionotus tribulus* C. & V. (29.)
84. *Prionotus scitulus* Jordan & Gilbert. (28.)
85. *Cephalacanthus volitans* L. (27.)
86. *Upsilonphorus y-græcum* C. & V. (26.?) (J.)
87. *Batrachus tau* L. (25.)
88. *Chasmodes bosquianus* Lacépède. (24.)
89. *Isesthes punctatus* Wood. (23.)
90. *Hypleurochilus geminatus* Wood. (22.)

All the specimens taken by us at Beaufort, as well as one example sent to me from Pensacola by Mr. Stearns, belong to the form described as *H. geminatus* by Jordan & Gilbert in the Synopsis Fish N. A. All (5) of Mr. Jenkins's specimens agree with the type described as *H. multifilis*. The former have the orbital cirri "not large, shorter than eye, branched at tip." The latter have the cirri "very high [not much shorter than head], each with four smaller ones at base." In color

both forms vary much with their surroundings. As I find no other difference between *multifilis* and *geminatus* I have no doubt of their specific identity. The latter is probably the female, the former the male of the same species. Similar sexual differences exist in other Blennies.

91. *Zoarces anguillaris* Peck. (21.)
 92. *Ophidion marginatum* De Kay. (20.)
 93. *Phycis regius* Walbaum. (19.)
 94. *Paralichthys albigutta* Jordan & Gilbert. (15, 16.)
 95. *Paralichthys lethostigma* Jordan & Gilbert. (15, 16.)
 96. *Paralichthys dentatus* L. (15, 16.)
 97. *Ancylosetta quadrocellata* Gill. (17.)
 98. *Bothus maculatus* Mitchill. (18.) (J.)
 99. *Citharichthys macrops* Dresel. (J.)

One specimen in good condition. This is the second specimen known of this well-marked species. It agrees very closely with the description given by Mr. Dresel.

100. *Etropus crossotus* Jordan & Gilbert. (J.)

Two large specimens. This is the northernmost locality at which this widely-distributed species has been taken.

101. *Etropus microstomus* Gill. (J.)
 (? *Citharichthys microstomus* Gill.)

A single fine specimen, apparently the third individual of the species known. It is less slender than the specimen described by Gill from Beasley's Point, and also less slender than the one described from Long Island by Ensign Dresel, but in other respects the agreement is reasonably close.

Color brown, with very faint longitudinal streaks of darker brown along the rows of scales. Body with roundish rather irregular ink-like spots of black, some of them nearly as large as the eye; four of these spots along the lateral line and two at base of caudal; spots above lateral line forming two irregular rows, about 7 in each row, concurrent with the back. A row of round spots along dorsal, and one along anal, besides finer punctulations. Whole left side of body, and all fins, covered with fine dark dots. Right side plain whitish.

Body ovate. Head, $4\frac{1}{2}$ in length to base of caudal; depth, $1\frac{9}{10}$ ($2\frac{1}{4}$ in total). D. 76; A. 56. Lat. l. 43. Maxillary, $4\frac{1}{3}$ in head. Eye, 3 in head. Snout very short, much shorter than eye. Preopercle of blind side without cirri. Pectoral, $1\frac{1}{2}$ in head.

Length of specimen about $3\frac{1}{2}$ inches.

102. *Achirus achirus mollis* Mitchill. (13.)

103. *Aphoristia fasciata* Holbrook. (12.)

104. *Fistularia tabaccaria* L. (11.)

105. *Siphostoma floridæ* Jordan & Gilbert. (10.)

Abundant.

106. *Siphostoma louisianæ* Günther. (10.)

Less common.

107. *Hippocampus punctulatus* Guichenot. (9.) (J.)

One specimen. D. 18. Head without cirri; body everywhere with light blue dots.

108. *Hippocampus hudsonius* De Kay.

The specimen described by Jordan & Gilbert in the Synopsis Fishes N. A. came from Beaufort.

109. *Monacanthus hispidus* L. (8.)

110. *Alutera schœpfi* Walbaum. (6, 7.)

111. *Ostracion trigonum* L. (5.)

112. *Tetrodon turgidus* Mitchill. (4.) (3.?)

113. *Chilomycterus schœpfi* Walbaum. (2.)

(*Chilomycterus geometricus* Bloch & Schneider.)

114. *Lophius piscatorius* L. (1.)

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